

# **Flood Operations Oroville Facilities**

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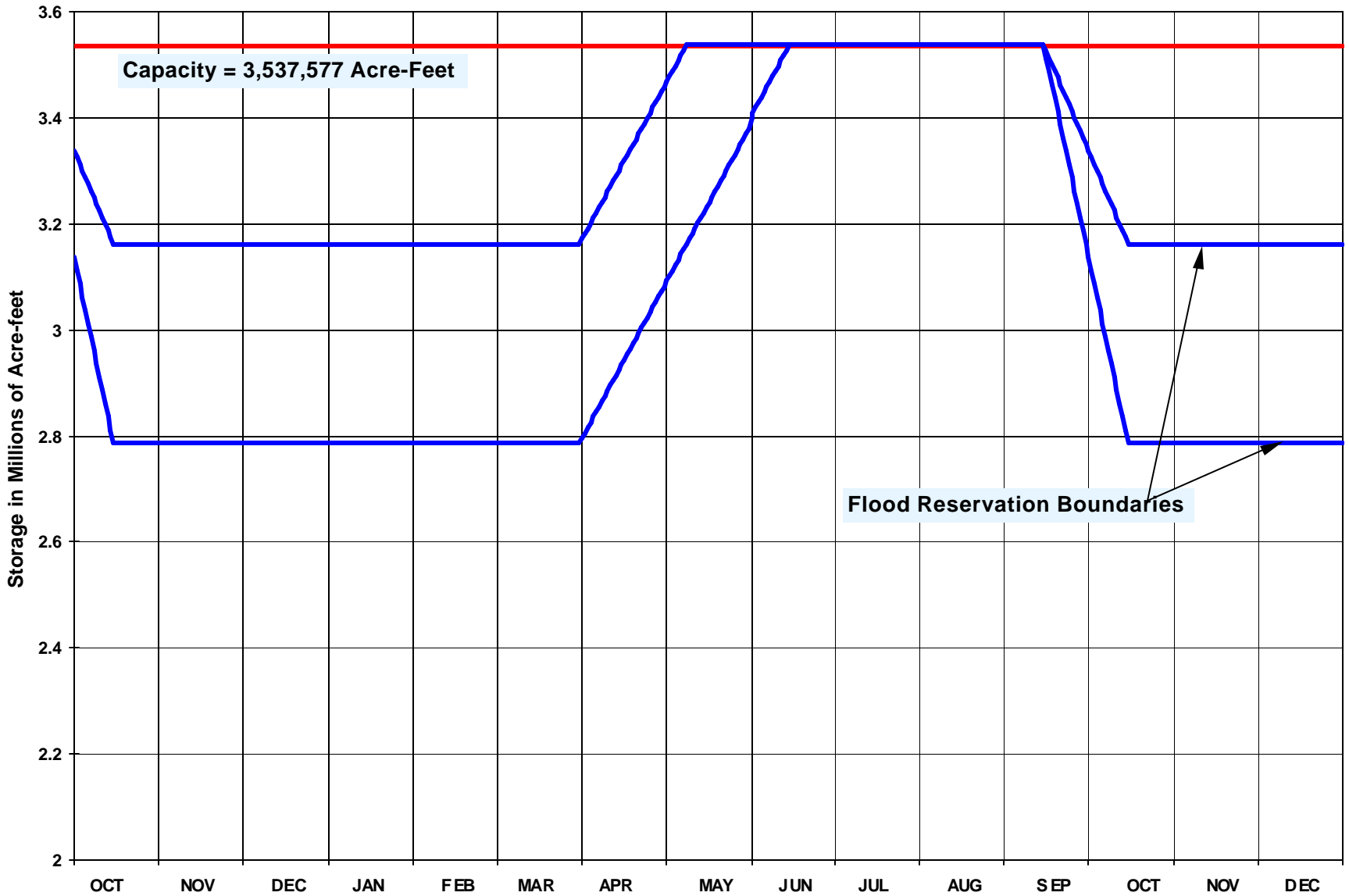
**Curtis Creel**

**Gary Bardini**

**Plenary Presentation**

**January 28, 2003**

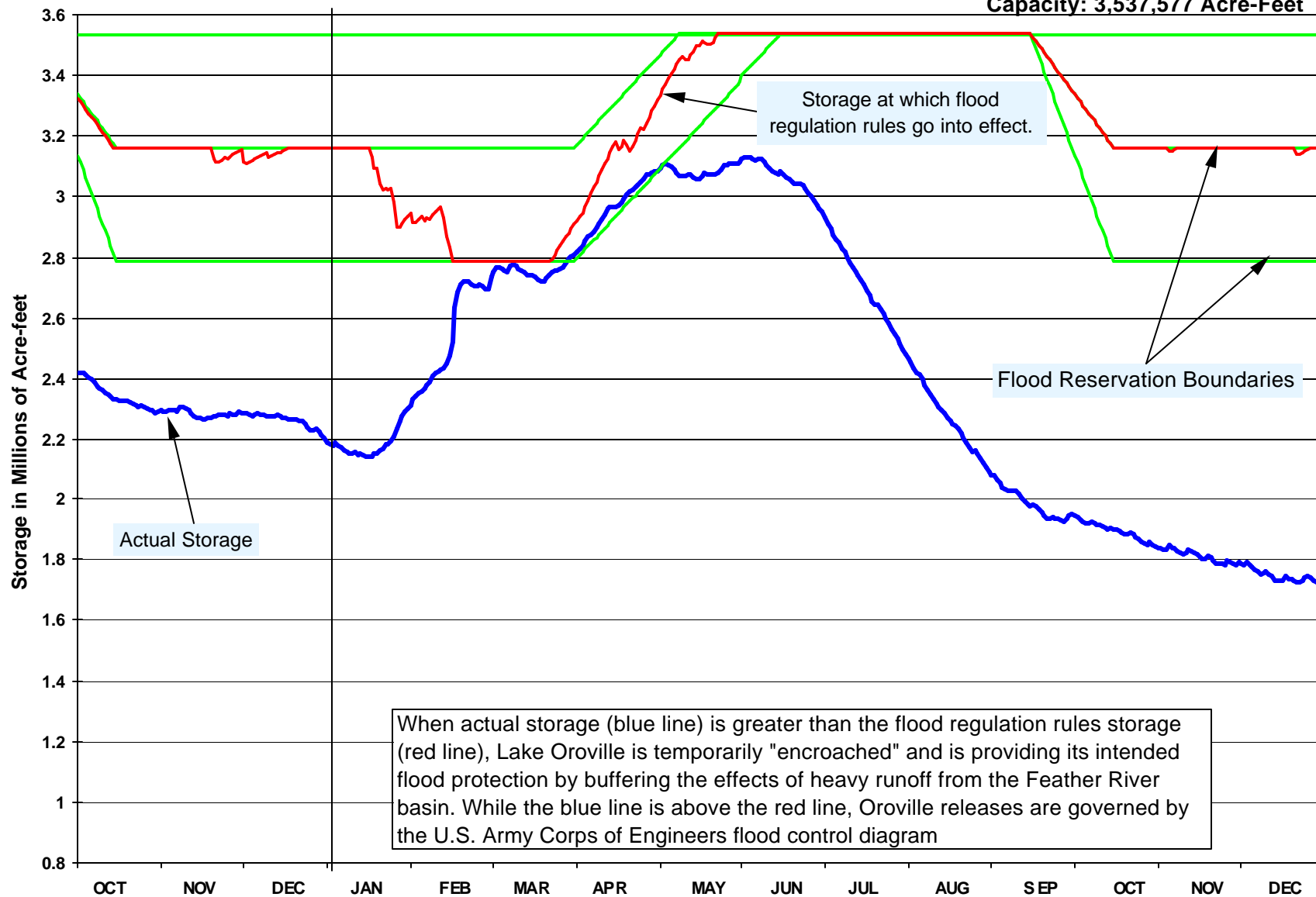
# Lake Oroville Flood Control Reservation



## Lake Oroville Storage

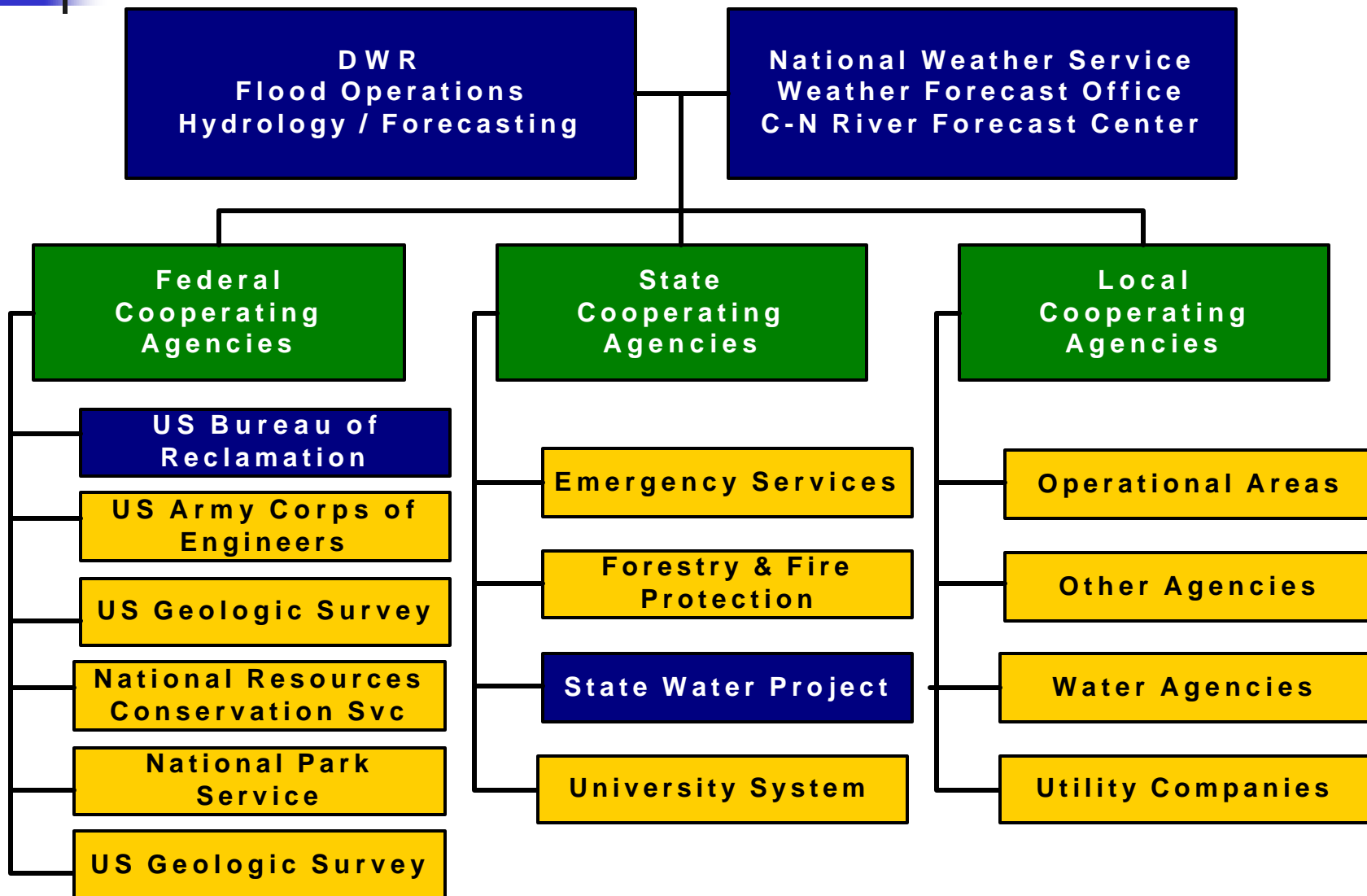
October 1, 1999 through December 31, 2000

Capacity: 3,537,577 Acre-Feet





# Cooperating Agencies (Co-located at JOC in Blue)





## Joint Operations Center Contacts

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Stein Buer, Chief  
Division of Flood Management, CADWR

Gary Hester, Chief  
Hydrology and Flood Operations  
Division of Flood Management, CADWR

Gary Bardini, Chief  
Hydrology Branch  
Division of Flood Management, CADWR

Jay Punia, Chief  
Flood Operations Branch  
Department of Flood Management, CADWR

Rob Hartman, Hydrologist in Charge  
California Nevada River Forecast Center  
National Weather Service

Carl Torgersen, Chief  
SWP Operations Control Office  
Div. of Operations and Maintenance, CADWR

Chat Bowling, Operations Manager  
Central Valley Operations Office  
U.S. Bureau of Reclamation



# CNRFC/DWR Products & Services

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**Short Range ... .. Long Range**

**Local Flood Warning Systems Support**

**Flash Flood Guidance**

**Flood Forecast Guidance**

**Reservoir Inflow Forecasts**

**Spring Snow Melt Forecasts**

**Water Supply Volume**



# Hydrologic Modeling

**Short Range** ... .. **Long Range**

## **LFWS**

short time step  
**SACSMA**

## **NWSRFS - OFS**

6 hour time step  
modular, deterministic

## **ESP.....**

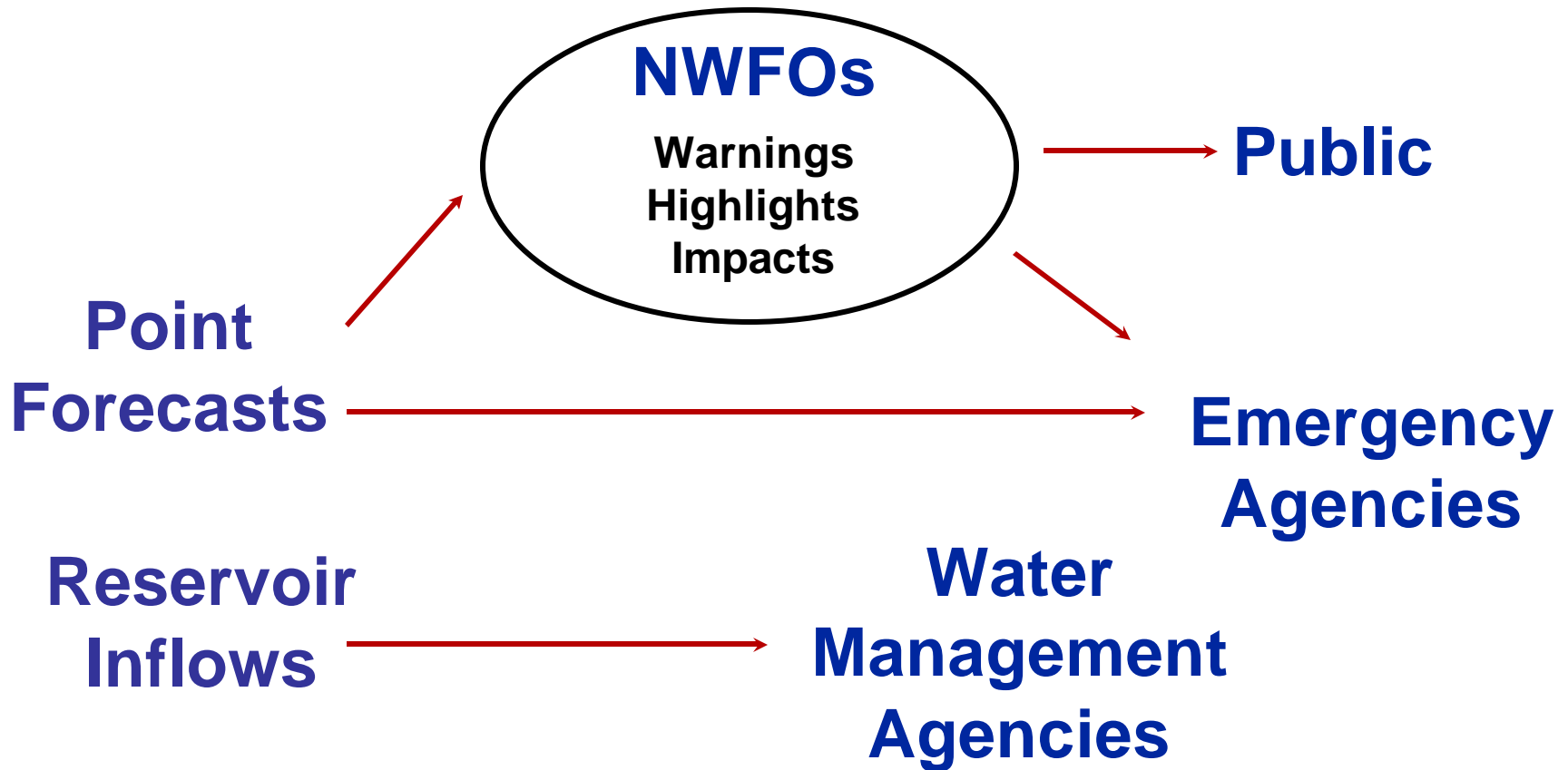
**NWSRFS configuration**  
**probabilistic**

## **Statistical**

**simple, efficient,**  
**inflexible**



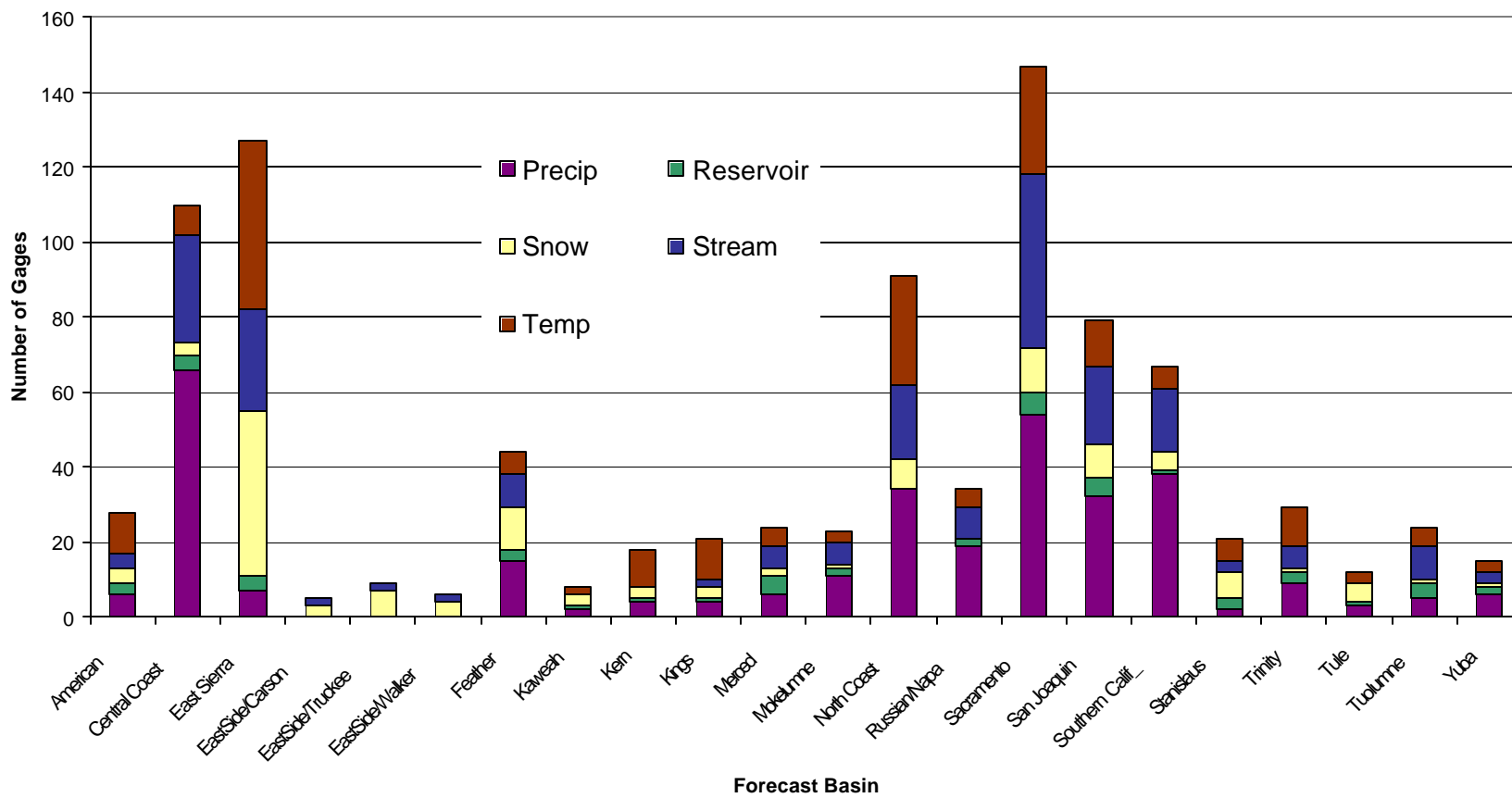
# CNRFC/DWR Forecast Dissemination





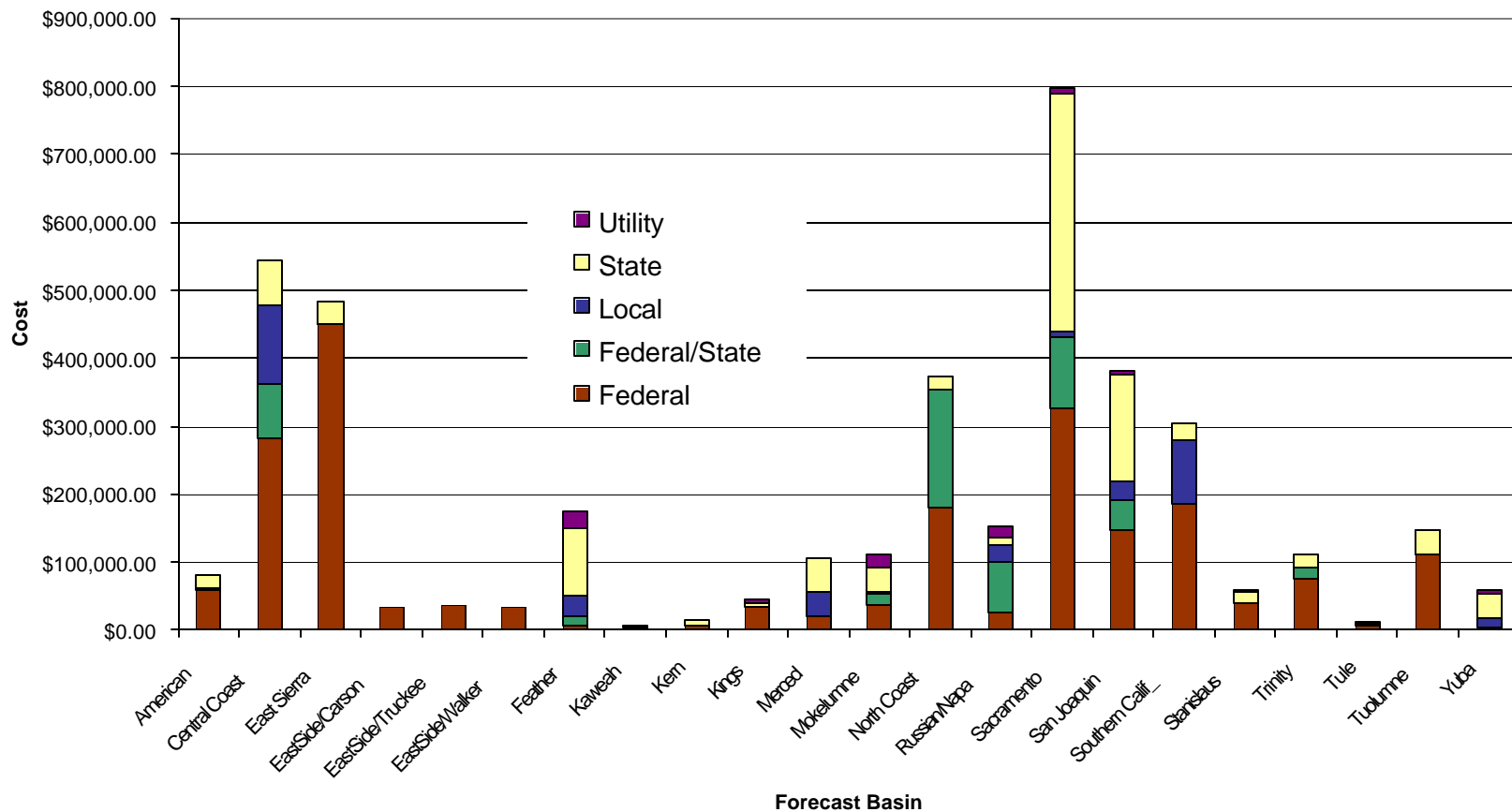


# Flood Forecast Gages





# Flood Forecast Gages



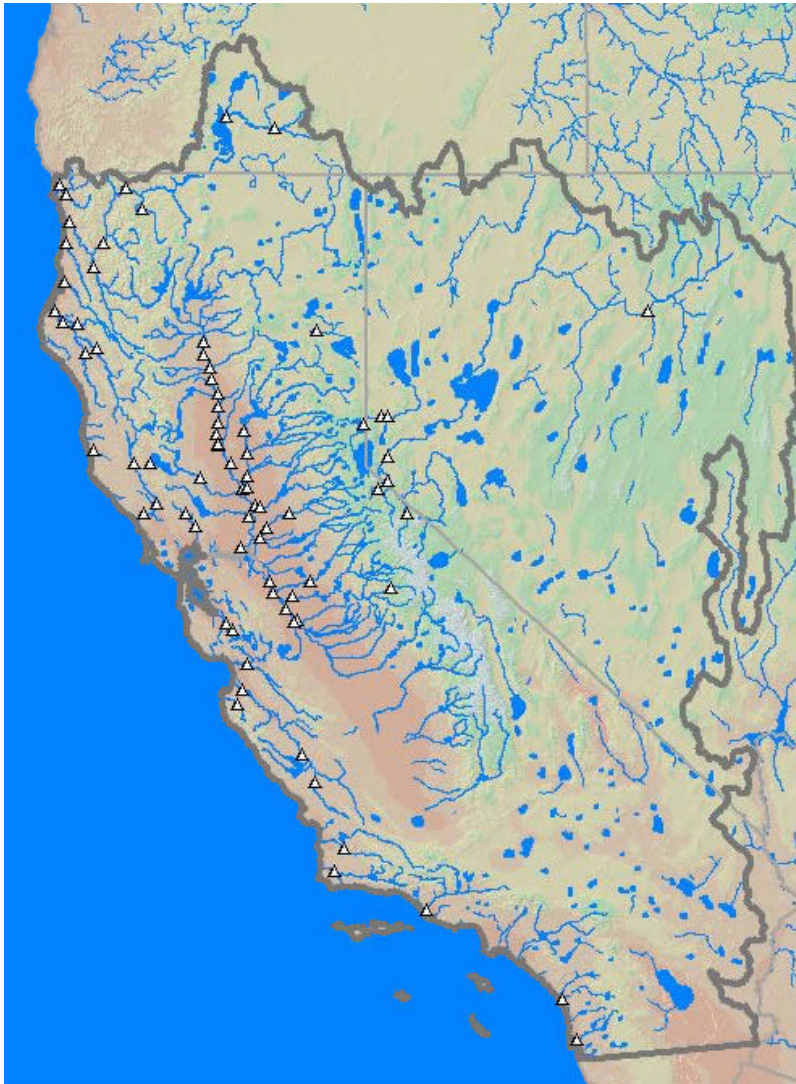
# Graphical River Forecast Guidance

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# Availability

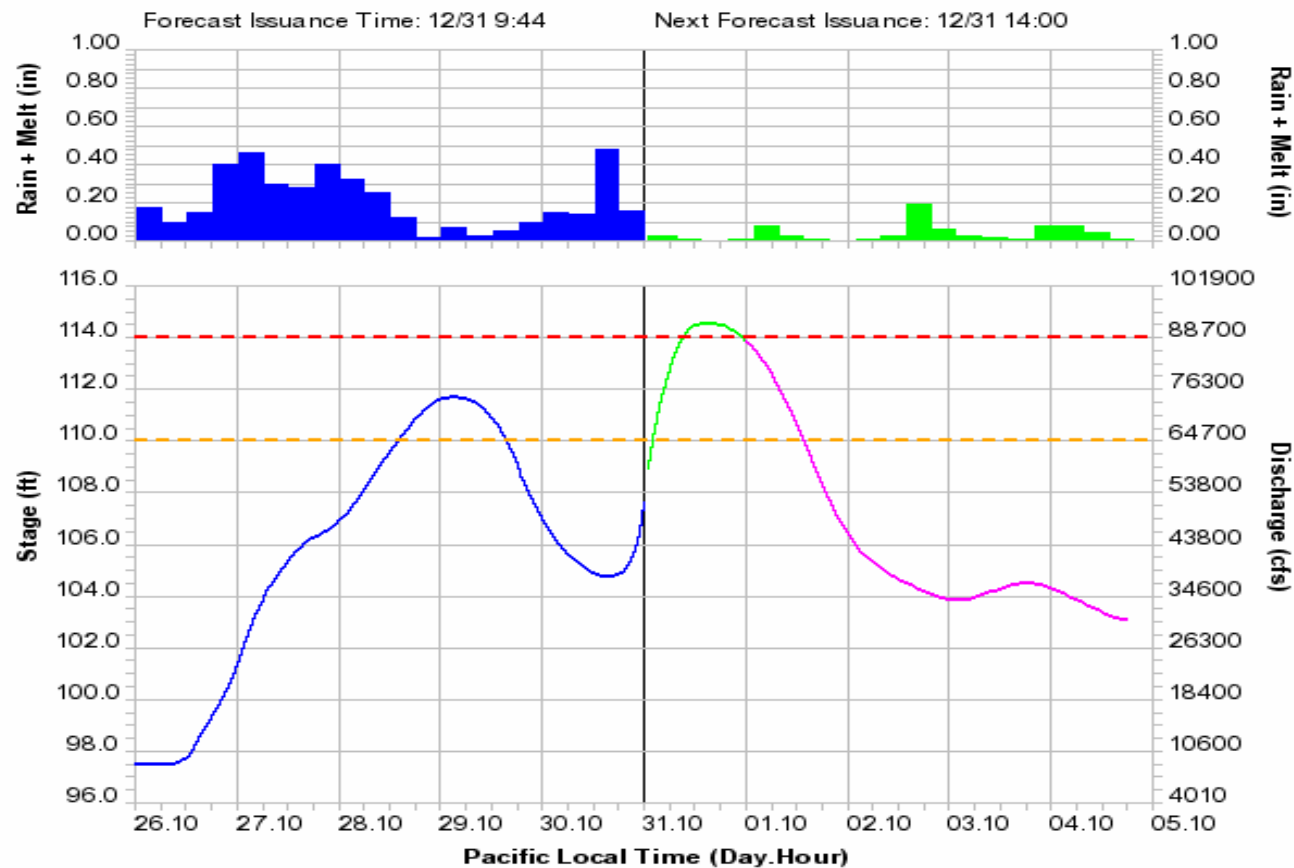


- ~80 official flood forecast points.
- Routine updates.
  - twice per day.
  - morning/afternoon.
- Updates during floods.
  - 8am/2pm/8pm/2am.
  - as needed.
- Visible to everyone.



# Graphical River Forecast Guidance

## ORFC1 - SACRAMENTO RIVER - Ord Ferry



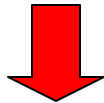
**Monitor Stage:** 110 feet

**Flood Stage:** 114 feet



## Products Description

Forecast Point Name and River Name



**ORFC1 - SACRAMENTO RIVER - Ord Ferry**

Forecast Issuance Time: 12/31 9:44

Next Forecast Issuance: 12/31 14:00



When Issued



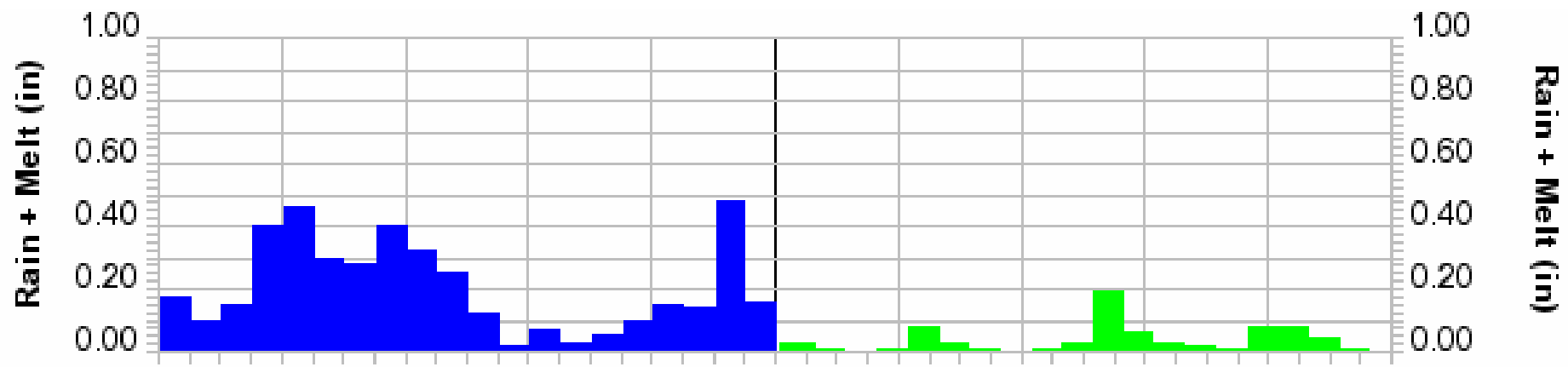
Approximate Time of Next Update

NOTE: Graphs are updated only after forecast models are run and official forecast is issued. The observed stage information is NOT updated between forecast issuances.



## Product Description

### Observed and Forecast Rain + Snowmelt



(Blue): Observed Rain + Snow  
Melt in 6 hr periods

(Green): Forecast Rain +  
Snow Melt in 6 hr periods

Note: The amounts shown are for the full watershed  
upstream of the forecast location.



# Product Description

(Red) Dotted Line: Flood Stage.

(Orange) Dotted Line: Monitor Stage.

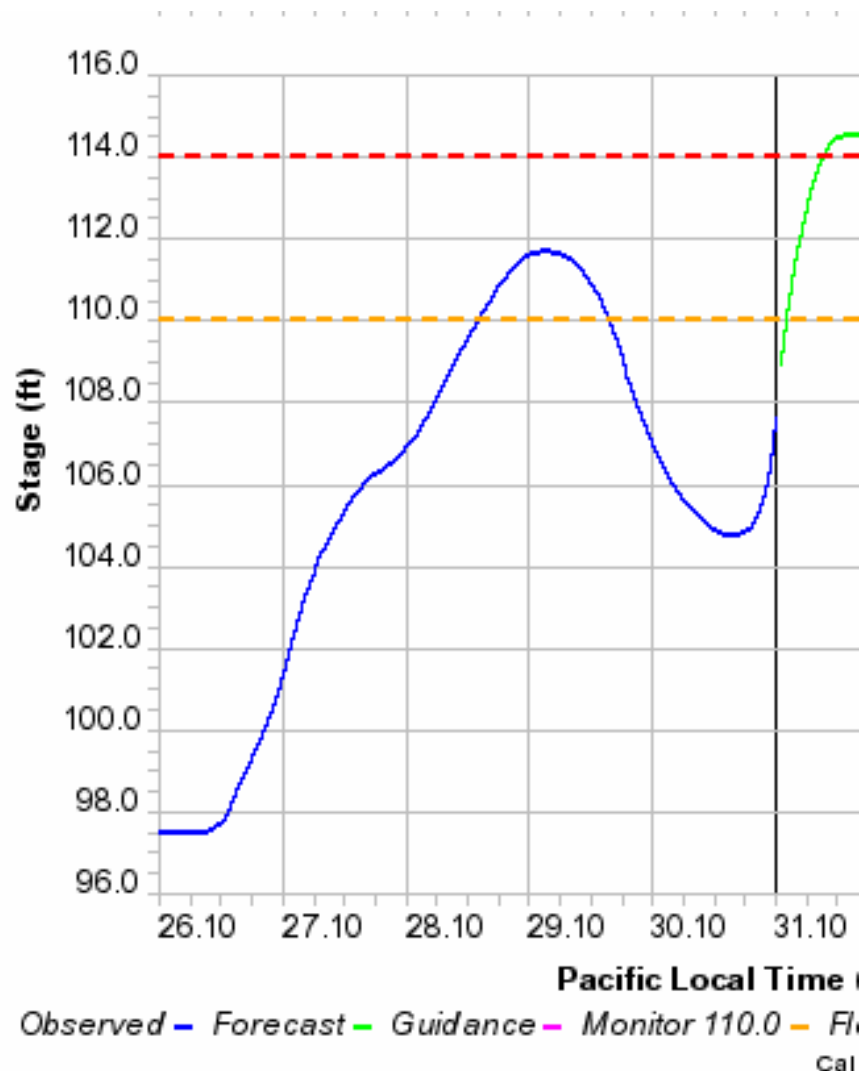
(Blue): Observed River Stage  
for previous 5 days.

Scale on left is stage (feet).

Scale on right is discharge (cfs).

Bottom Scale: Date and Hour.

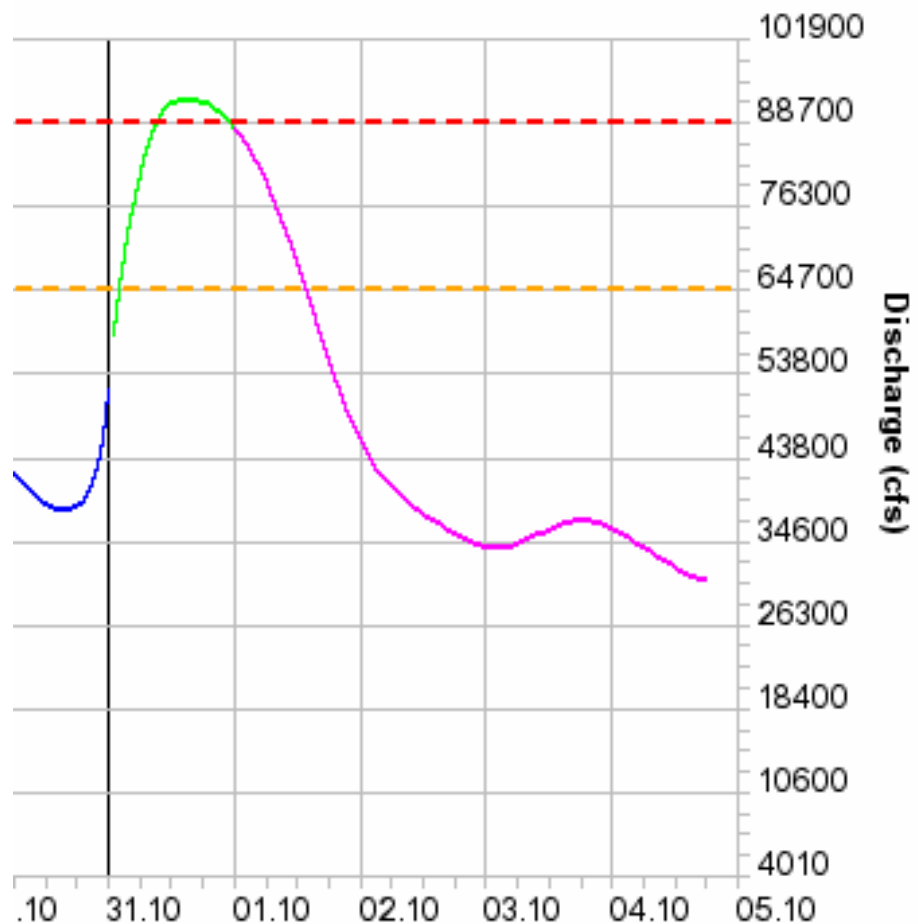
NOTE: Vertical gray lines are NOT  
midnight to midnight divisions.







# Product Description



Local Time (Day.Hour)

110.0 — Flood 114.0 — California Department of Water Resources  
California Nevada River Forecast Center (CNRFC), NWS/NOAA

- (Green): River Forecast.
  - Values consistent with text products.
    - CDEC Bulletins
    - NWS watches, warnings, and statements.
  - Forecast length.
    - 12 – 48 hours.
    - Varies with location.
    - Can vary with event.



# Product Description



Local Time (Day.Hour)

110.0 — Flood 114.0 — California Department of Water Resources  
California Nevada River Forecast Center (CNRFC), NWS/NOAA

- (Magenta): River Guidance.
  - Values *not* included in text products.
  - Forecast length.
    - End of **forecast period** through 5<sup>th</sup> day.
  - Larger uncertainty.
  - Subject to significant change.
    - Updated QPF.
    - Revised reservoir regulation.



## Relationship with Official Text Products

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- Graphical river forecast guidance *supplements* information provided in CDEC river bulletins and NWS watches, warnings, and statements.
- Stages/flows shown in GREEN should be fully consistent with the information in official text products.
- Guidance period information is provided for PLANNING PURPOSES ONLY.



## Where do I find them?

- California Data Exchange Center
  - [http://cdec.water.ca.gov/guidance\\_plots/](http://cdec.water.ca.gov/guidance_plots/)
- National Weather Service
  - CNRFC
    - [http://www.wrh.noaa.gov/cnrfc/rfc\\_guidance.html](http://www.wrh.noaa.gov/cnrfc/rfc_guidance.html)
  - WFO Eureka
    - <http://www.wrh.noaa.gov/Eureka/rivers/>
  - WFO Monterey
    - <http://www.wrh.noaa.gov/Monterey/> (soon)
  - WFO Sacramento
    - [http://www.wrh.noaa.gov/sacramento/html/hydro\\_data.html](http://www.wrh.noaa.gov/sacramento/html/hydro_data.html)



## Forecast Sequence

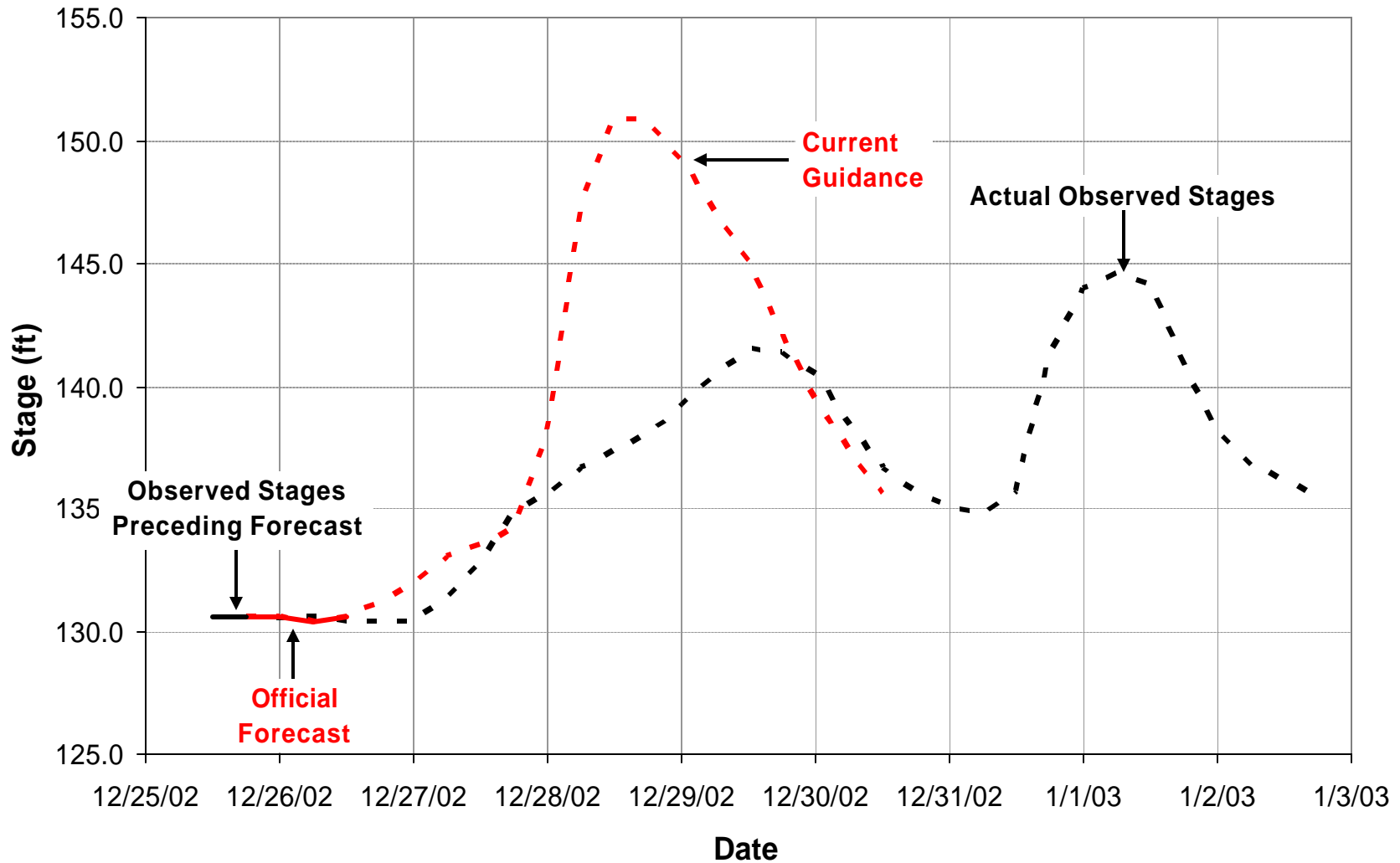
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- Sacramento River at Hamilton City.
- December 25, 2002 through January 01, 2003
- Morning forecasts only.
  - Updates issued at 6 hour intervals 12/27-01/01.



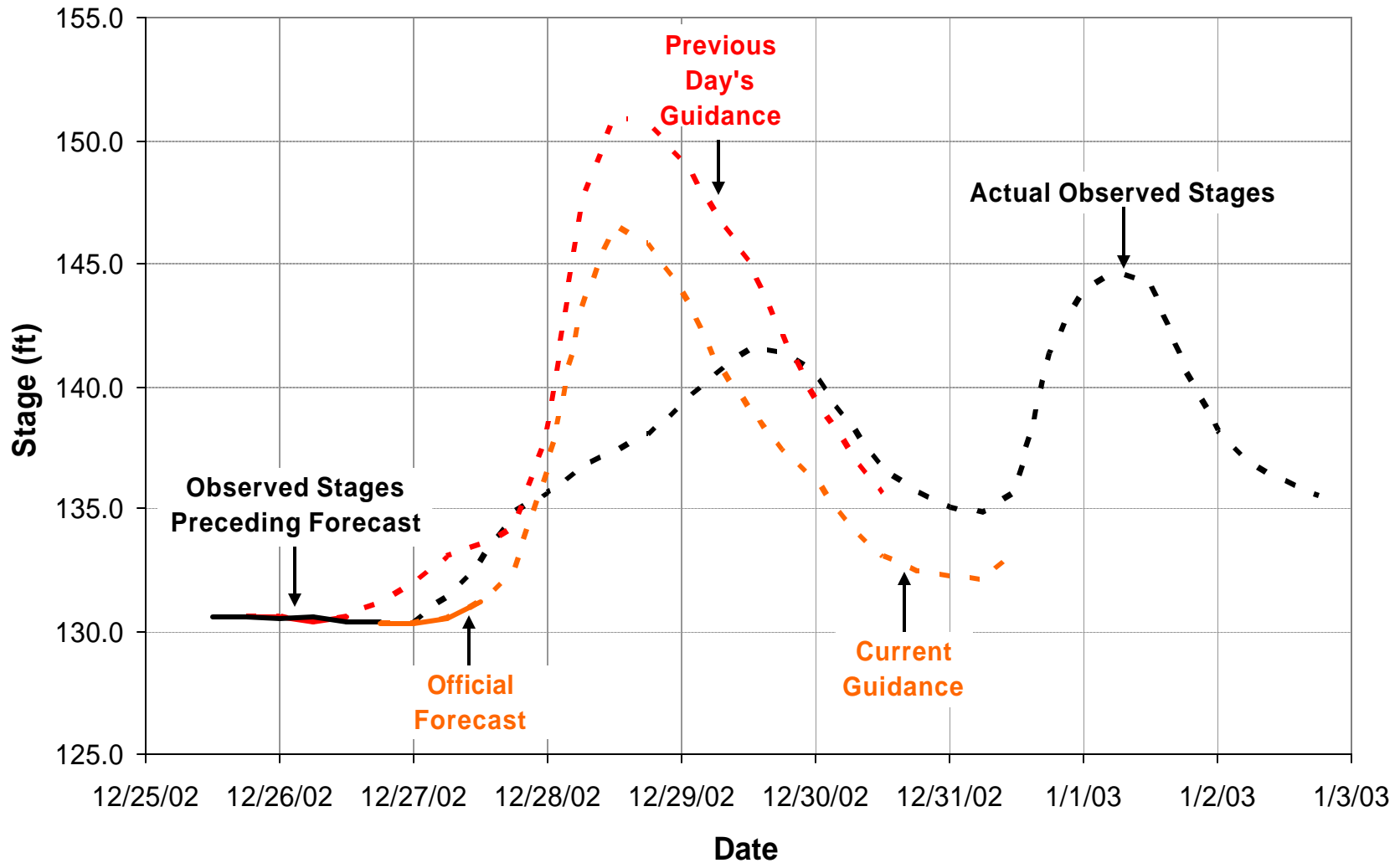
## Sacramento River at Hamilton City - Forecast Plot

### 12/25 16Z (8 am PST) Forecast 1





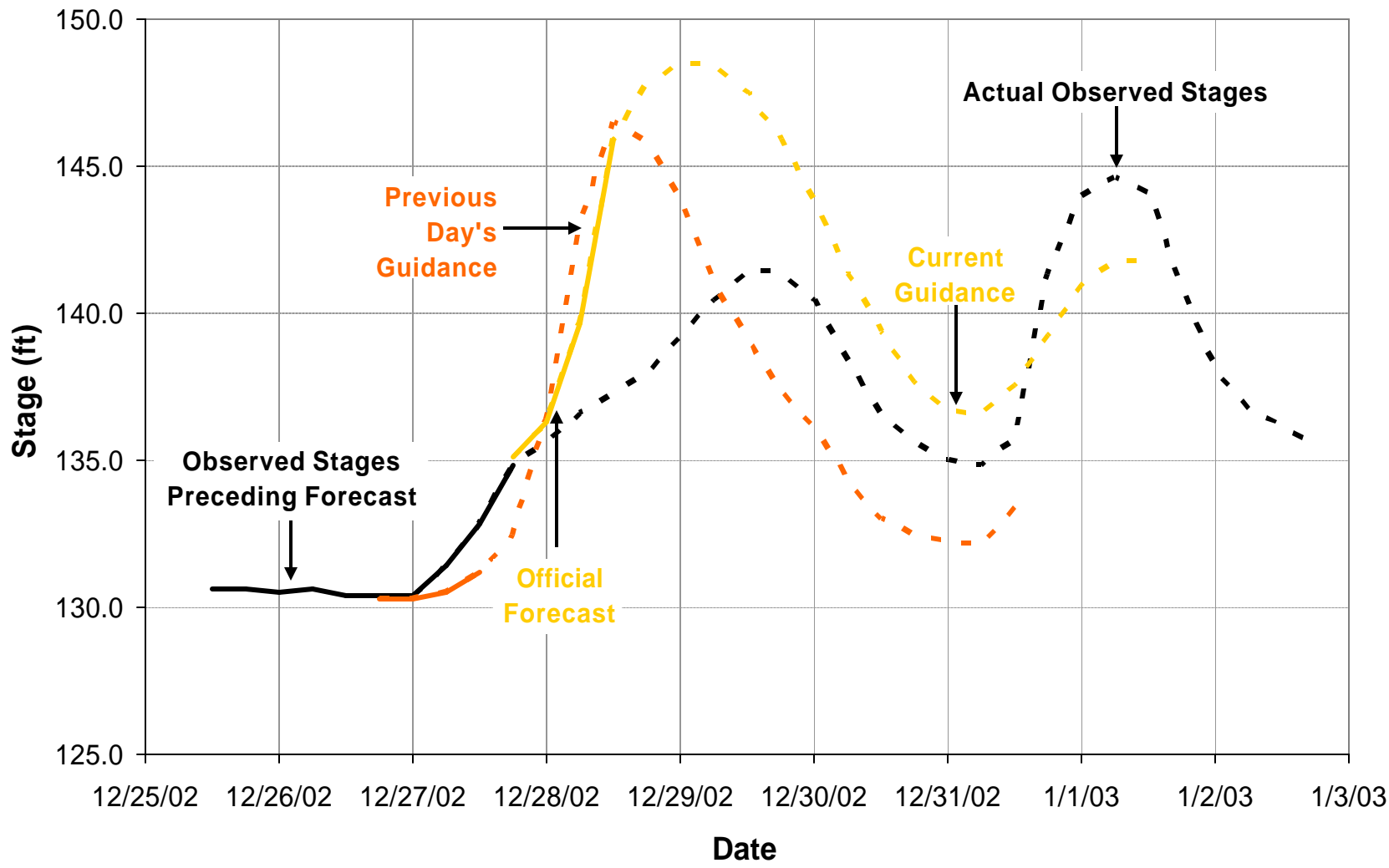
## Sacramento River at Hamilton City - Forecast Plot 12/26 16Z (8 am PST) Forecast 2





# Sacramento River at Hamilton City - Forecast Plot

## 12/27 16Z (8 am PST) Forecast 3

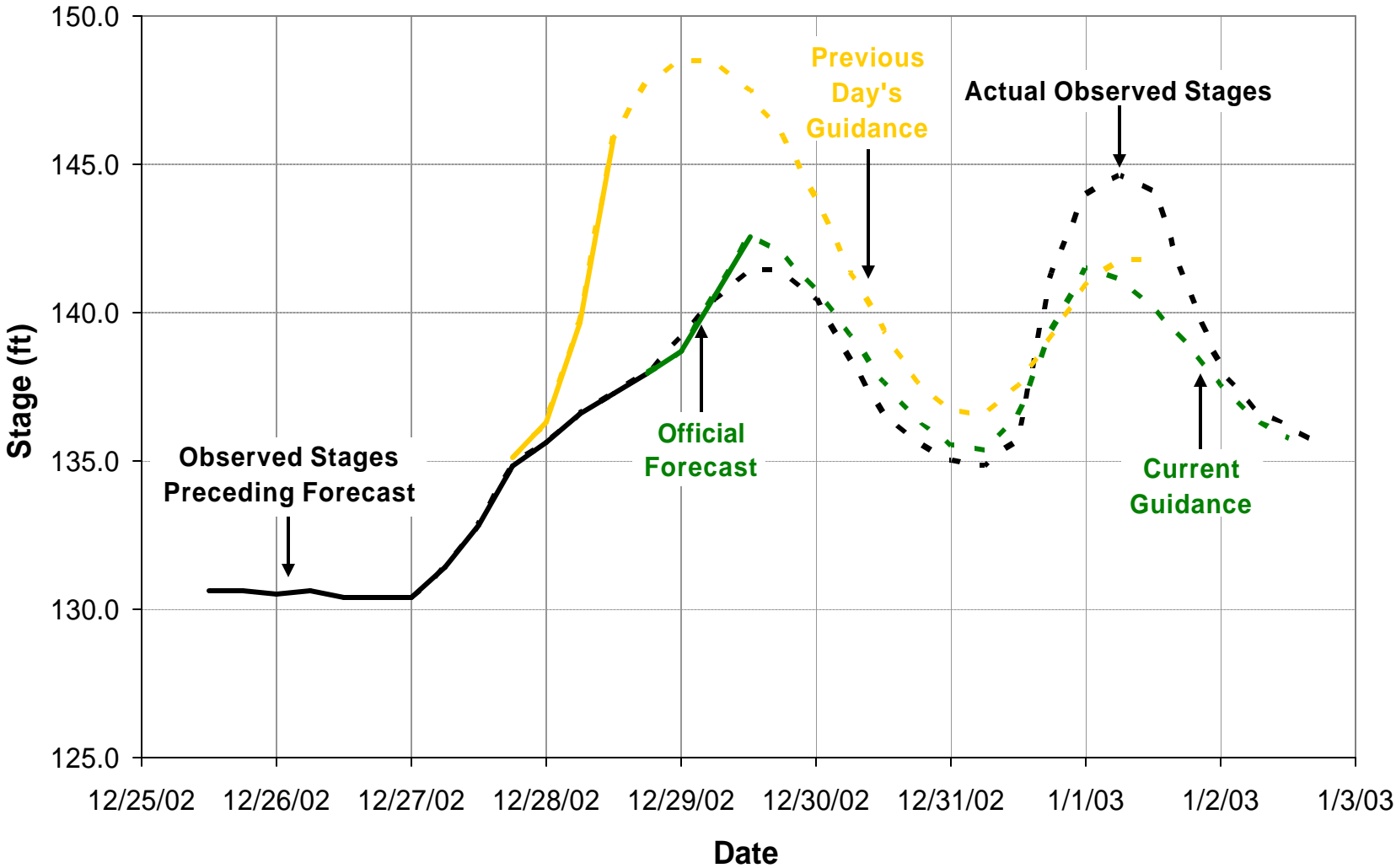






# Sacramento River at Hamilton City - Forecast Plot

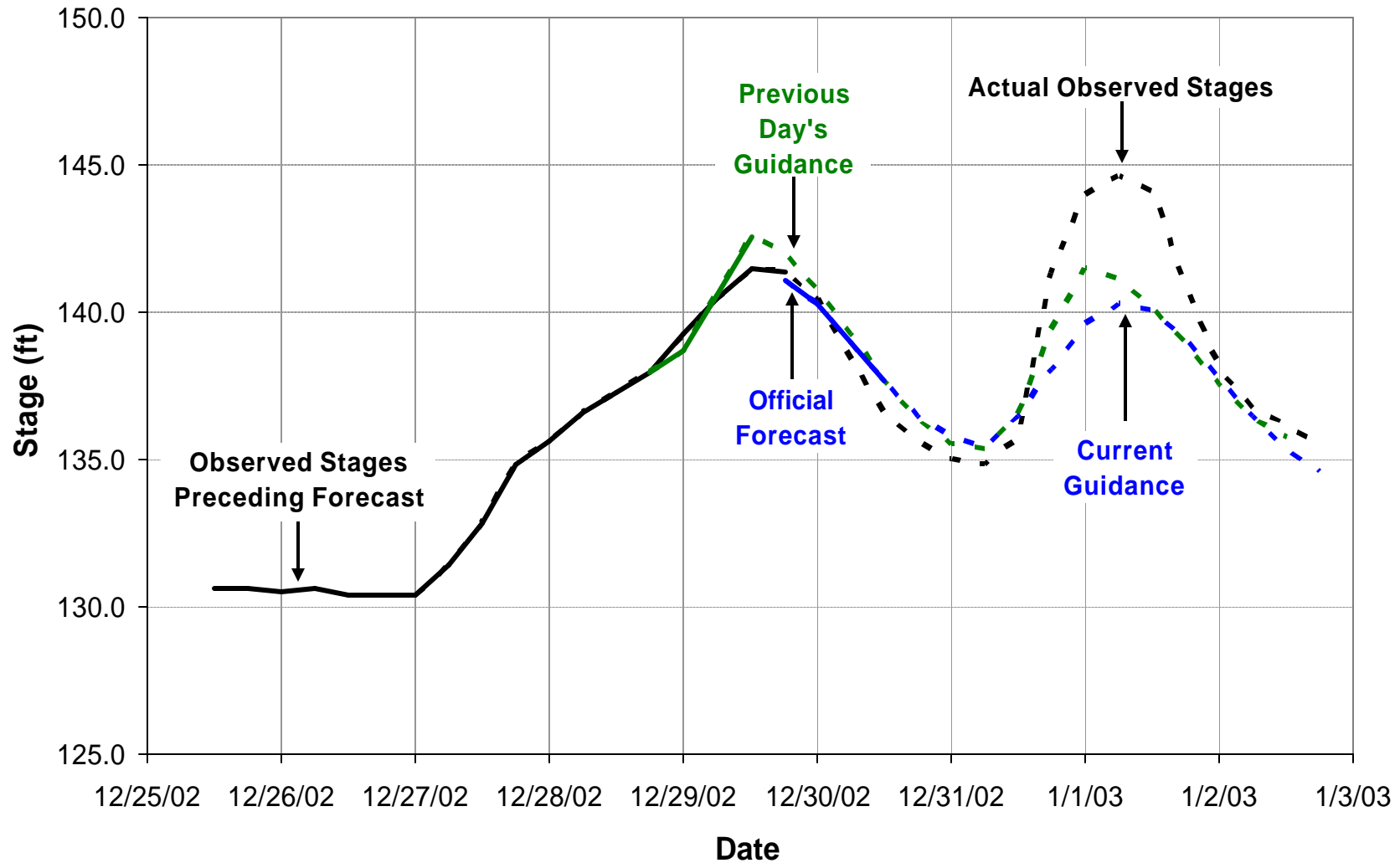
## 12/28 16Z (8 am PST) Forecast 4





## Sacramento River at Hamilton City - Forecast Plot

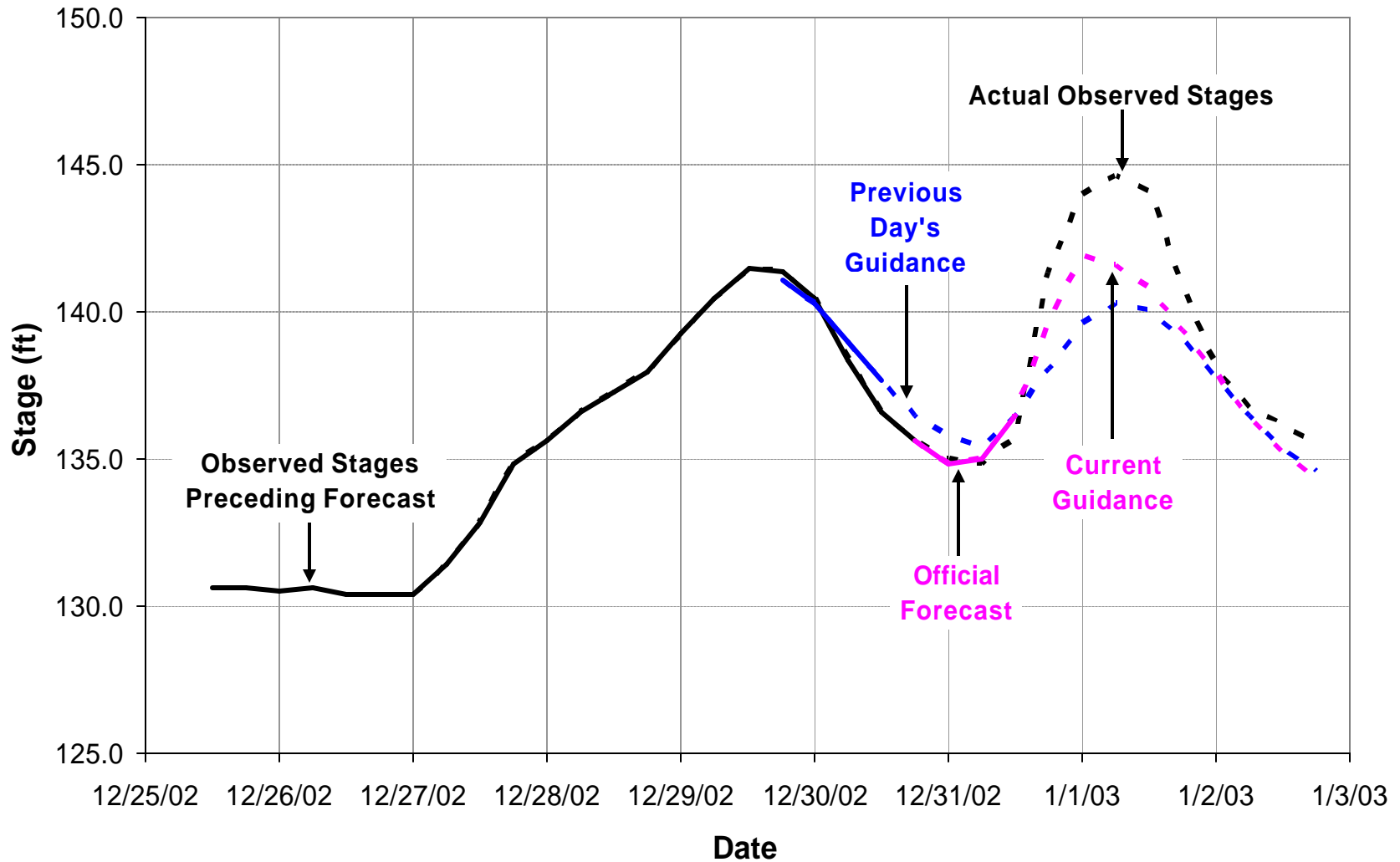
### 12/29 16Z (8 am PST) Forecast 5





## Sacramento River at Hamilton City - Forecast Plot

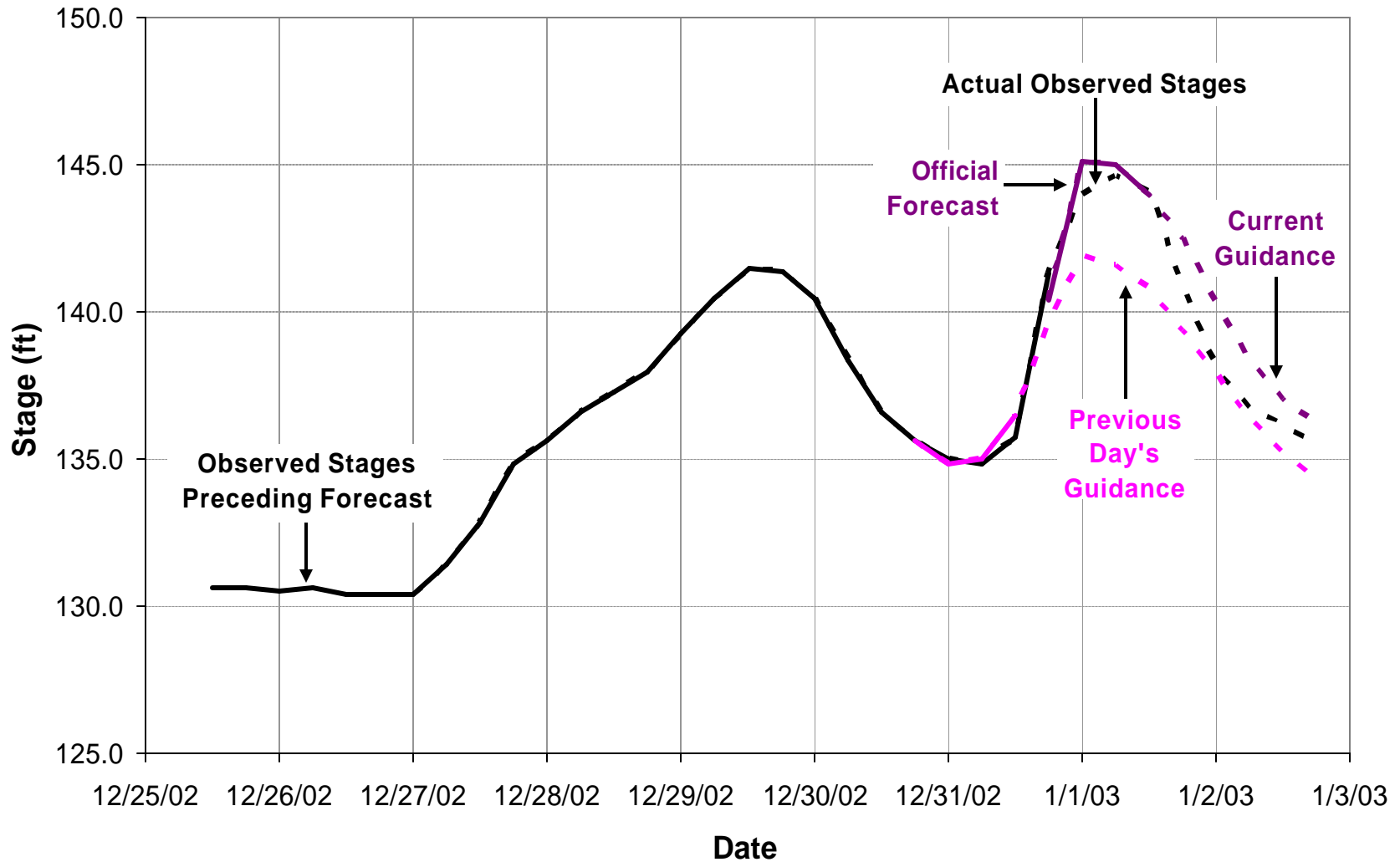
### 12/30 16Z (8 am PST) Forecast 6





## Sacramento River at Hamilton City - Forecast Plot

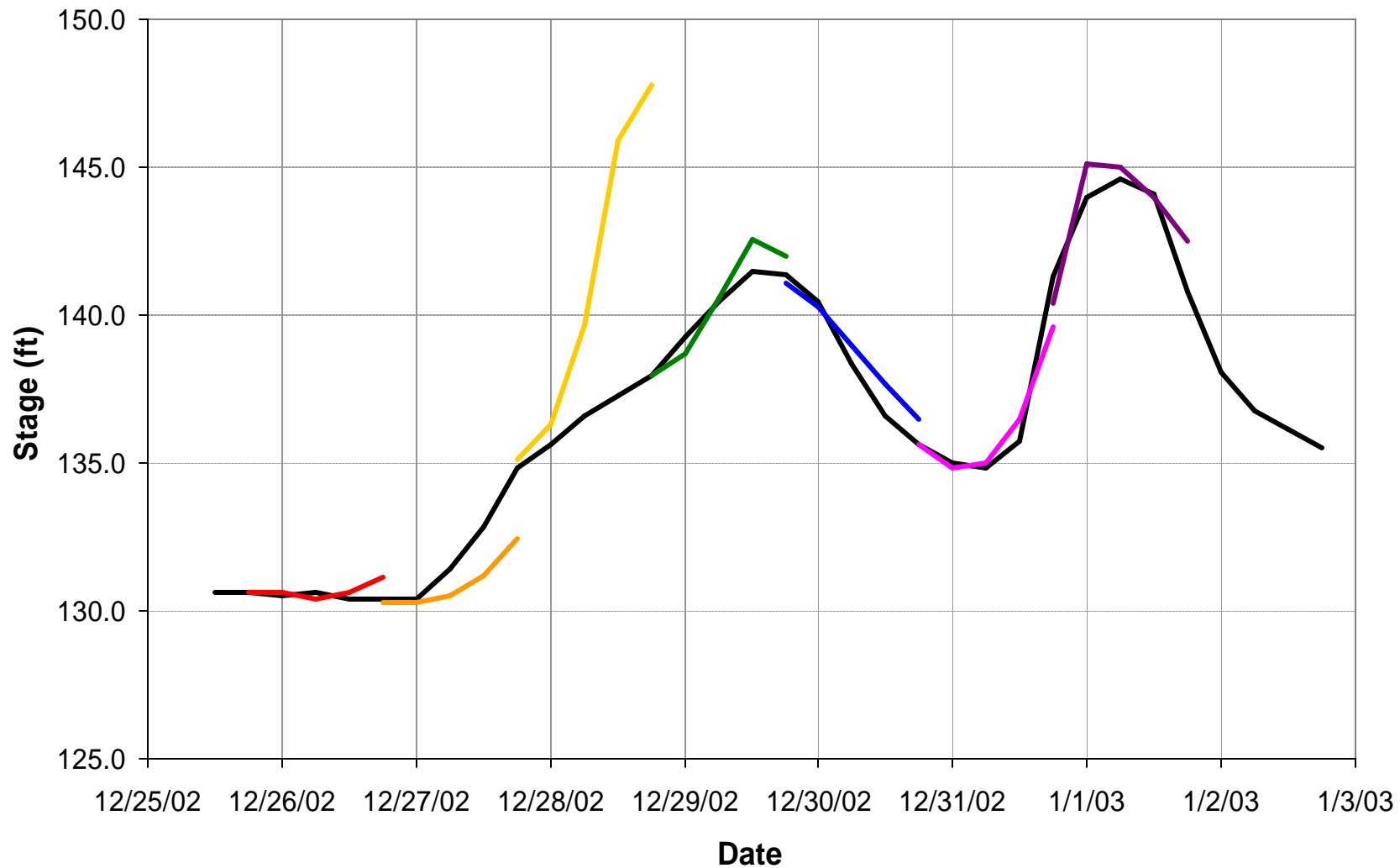
### 12/31 16Z (8 am PST) Forecast 7





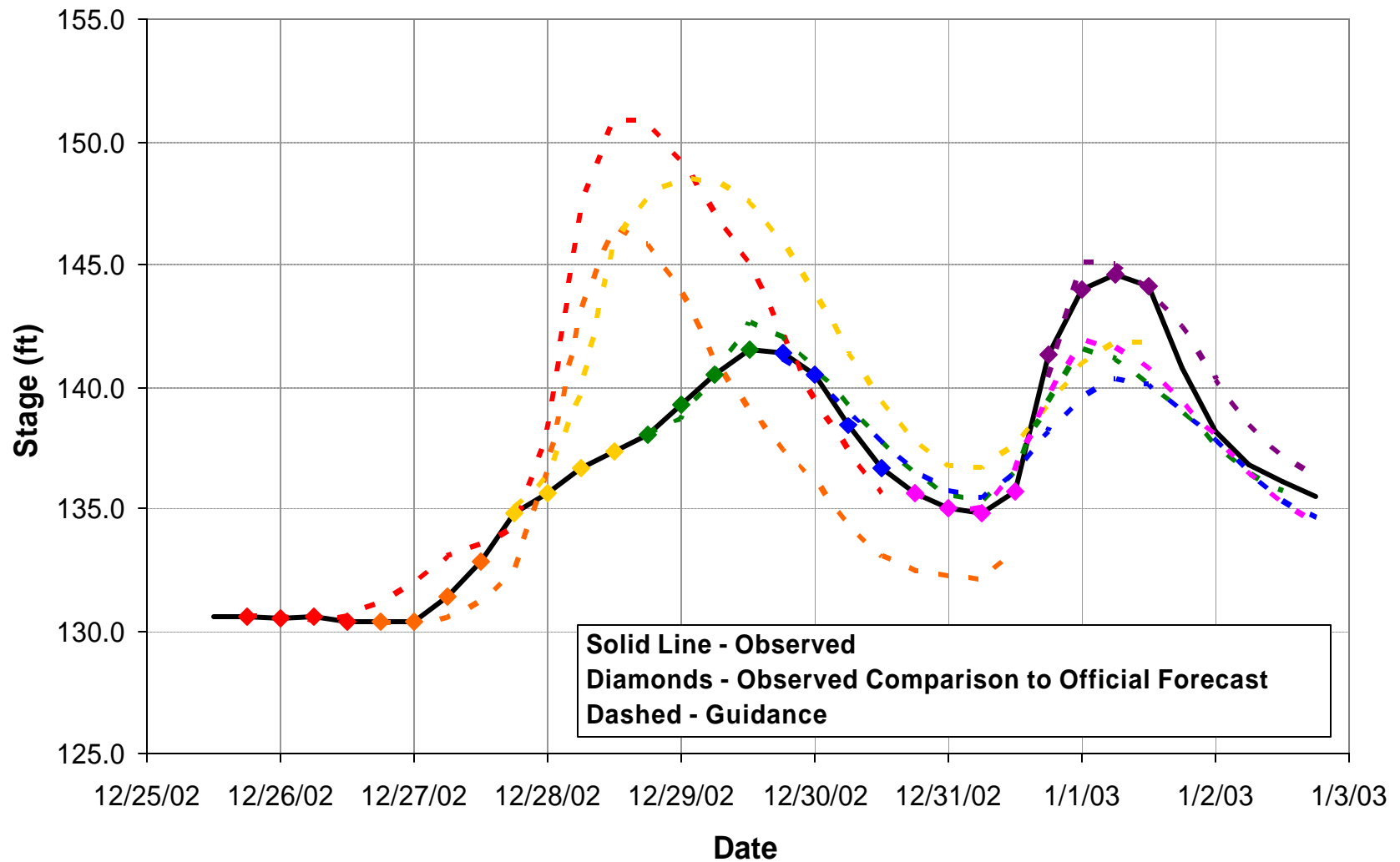
## Sacramento River at Hamilton City

### Forecast Sequence (Forecasts Produced Daily at 16Z (8 am PST))





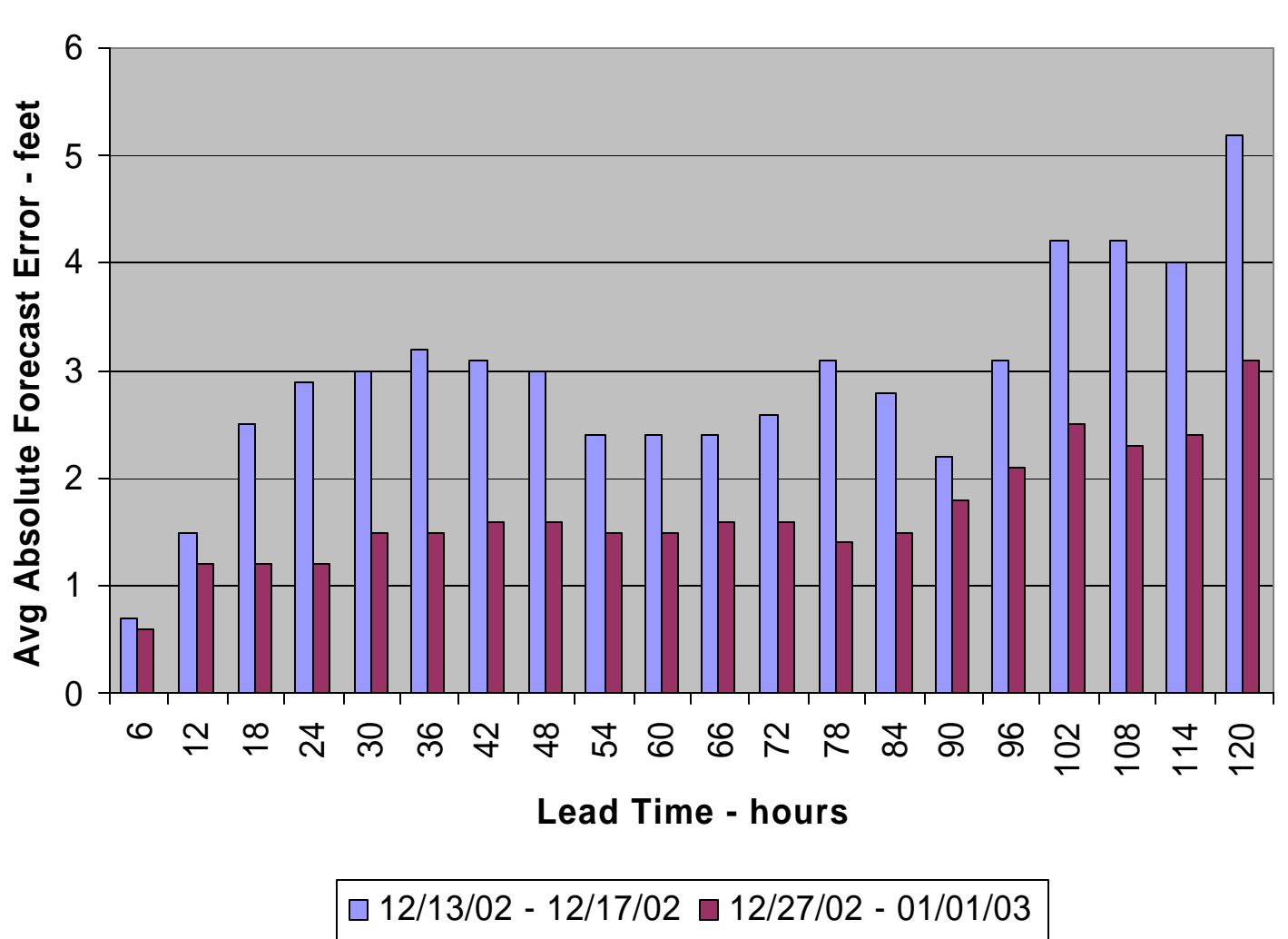
## Sacramento River at Hamilton City - Composite Forecast Plot





# Forecast Errors

## Eel River at Fernbridge





## Final Cautions

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- Guidance period information is intended for your planning purposes only.
- River forecasting contains a lot of uncertainty!
  - Timing and amount of rainfall can be very different from what is forecast.
  - In mountainous watersheds, snow/rain mixture will affect the actual streamflow.
  - Unanticipated reservoir regulation will affect downstream forecasts and guidance.